

## **CLAIMS**

What is claimed is:

1. An apparatus, comprising:
  - a variable speed bus;
  - a first unit coupled to the variable speed bus;
  - a second unit coupled to the variable speed bus; and
  - an arbitration and bus clock control unit to adjust the variable speed bus frequency depending on the bandwidth requirements of the first and second units, the arbitration and bus clock control unit to monitor request rates from the first and second units in order to determine bandwidth requirements.
2. The apparatus of claim 1, wherein the first unit is a processor unit.
3. The apparatus of claim 1, wherein the second unit is a video processor unit.
4. The apparatus of claim 1, wherein the first unit is a hard disk drive controller unit.
5. The apparatus of claim 1, wherein the second unit is an isochronous data transfer unit.
6. The apparatus of claim 5, wherein the arbitration and bus control unit recognizes that a request from the isochronous data transfer unit is for an isochronous data transfer and provides adequate bus bandwidth to accommodate the isochronous data transfer.

7. The apparatus of claim 6, wherein the isochronous data transfer unit is a 1394 controller unit.

8. The apparatus of claim 6, wherein the isochronous data transfer unit is a USB controller unit.

9. The apparatus of claim 1, wherein the variable speed bus, the first unit, the second unit, and the arbitration and clock control unit are located on a single semiconductor die.

10. A system, comprising:  
a variable speed bus;  
a device coupled to the variable speed bus including a bus interface logic unit; and  
an arbitration and bus clock control unit to adjust the frequency of a variable speed bus depending on the bandwidth requirements of the device coupled to the variable speed bus, the arbitration and bus clock control unit to monitor a request rate from the device coupled to the variable speed bus in order to determine bandwidth requirements.

11. The system of claim 10, the arbitration and bus control unit to communicate bus frequency information to the bus interface logic unit.

12. The system of claim 10, wherein the device coupled to the variable speed bus is a processor.

13. The system of claim 10, wherein the device coupled to the variable speed bus is a video processor.

14. The system of claim 10, wherein the device coupled to the variable speed bus is a hard disk drive controller.

15. The system of claim 10, wherein the device coupled to the variable speed bus is an isochronous data transfer controller.

16. The system of claim 15, wherein the arbitration and bus control unit recognizes that a request from the isochronous data transfer controller unit is for an isochronous data transfer and provides adequate bus bandwidth to accommodate the isochronous data transfer.

17. The system of claim 16, wherein the isochronous data transfer controller is a 1394 controller.

18. The system of claim 16, wherein the isochronous data transfer controller is a USB controller.

18. A method, comprising:  
receiving at an arbiter a plurality of requests from a first unit coupled to a variable speed bus;  
determining a request rate for the first unit; and  
adjusting the clock frequency of the variable speed bus depending on the determined request rate for the first unit.

19. The method of claim 18, further comprising:  
receiving at the arbiter a plurality of requests from a second unit coupled to the variable speed bus;

determining a request rate for the second unit; and  
adjusting the clock frequency of the variable speed bus depending on the  
determined request rates for the first and second units.

20. The method of claim 19, wherein receiving at the arbiter a plurality of requests from the second unit includes receiving requests from an isochronous data transfer controller, and further wherein adjusting the clock frequency includes guaranteeing adequate bandwidth for an isochronous data transfer.